

# COMADC Board and Etc.

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For CKM Collaboration

# The COMADC Board

- The COMADC board is a test board primarily to test the 2-phase current integrator (developed by Ken Nelson).
- It has the integrator, commercial 14-bit ADC, FPGA, Serdes and optic fiber out. (see [comadc\\_sch.pdf](#) for block diagram)

# The COMADC Board

- The Serdes and optic fiber out are identical with the QIE test board (which Kwami designed). Therefore it can be plugged into the DAQ PCI module (which Bill designed) directly.

# The COMADC Board

- A version of layout has been reached. (see “comadc\_lay.pdf” pictures)

# The COMADC Board (to do)

- Refine the layout. (0 Weeks?)
- Post process done by our CAD group. (2 weeks)
- Fabrication. (2 weeks)
- Partial assembly and tests.

# The COMADC Board (schedule)

- Work req. date: 10-01-2002, Yes.
- Catch Jlab test beam?

# Etc.

- What are those wires? (see comadc\_lay.pdf)  
Too much details.
- But, the current technical choices in the digital design create some implications we should let the collaboration know.

This talk is too long.  
Only fun part will be shown.  
For full version, see CKM\_62

# Data Format for CKM

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# TDC Data

15							8	7							0
----	--	--	--	--	--	--	---	---	--	--	--	--	--	--	---

Roll-over Marker

1	1	0	0	TS[9:6]				Ch. #							
---	---	---	---	---------	--	--	--	-------	--	--	--	--	--	--	--

Check sum word

1	1	0	1					Check sum of past centenary							
---	---	---	---	--	--	--	--	-----------------------------	--	--	--	--	--	--	--

TDC data

0	E	D	TS[7:0]								Time (1ns/bin)				
---	---	---	---------	--	--	--	--	--	--	--	----------------	--	--	--	--

Error bit

Double hit  
marker  
from TDC

Earliest Time from  
CLK leading edge

# Veto System Data

15							8	7							0
----	--	--	--	--	--	--	---	---	--	--	--	--	--	--	---

Roll-over Marker

1	1	0	0	TS[9:6]	Ch. #
---	---	---	---	---------	-------

Hitlet Header

1	0	E		TS[9:0]
---	---	---	--	---------

QIE only data

0	0		CapID	QIE (2 range, 6 mantissa)
---	---	--	-------	---------------------------

(QIE+TDC) data

0	1	D	Time (1ns/bin)	QIE (2 range, 6 mantissa)
---	---	---	----------------	---------------------------

Check sum word

1	1	0	1	Check sum of past centenary
---	---	---	---	-----------------------------

# Centenaries: (TDC Example)

Check sum word	1	1	0	1		Check sum of past centenary	C. 1
TDC data	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
Roll-over Marker	1	1	0	0	TS[9:6]	Ch. #	C. 0
Check sum word	1	1	0	1		Check sum of past centenary	
TDC data	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
	0	E	D	TS[7:0]		Time (1ns/bin)	
Roll-over Marker	1	1	0	0	TS[9:6]	Ch. #	

# Millenary Structure

Centenary 255

	1	1	0	1		Check sum of past centenary
	0	E	D	TS[7:0]		Time (1ns/bin)
	1	1	0	0	TS[9:6]	Ch. #
	1	1	0	0		Centenary ID = TS[15:8]

Centenary 0

	1	1	0	1		Check sum of past centenary
	0	E	D	TS[7:0]		Time (1ns/bin)
	0	E	D	TS[7:0]		Time (1ns/bin)
	1	1	0	0	TS[9:6]	Ch. #
	1	1	0	0		Centenary ID = TS[15:8]

Centenary ID word:  
Inserted while  
forming Millenary

	1	1	1	1	Millenary Check Sum [11:0]	
	1	1	1	1	Millenary Word Count [23:12]	
	1	1	1	1	Millenary Word Count [11:0]	
	1	1	1	1	Unified Channel Number [23:12]	
	1	1	1	1	Unified Channel Number [11:0]	
	1	1	1	1	Reset ID [3:0]	Millenary ID [31:24]
	1	1	1	1	Millenary ID [23:12]	
	1	1	1	0	Millenary ID [11:0]	


Millenary Header

# Millenary Header Words

Centenary ID  
One for each  
centenary

15							8	7							0
1	1	0	0					Centenary ID = TS[15:8]							

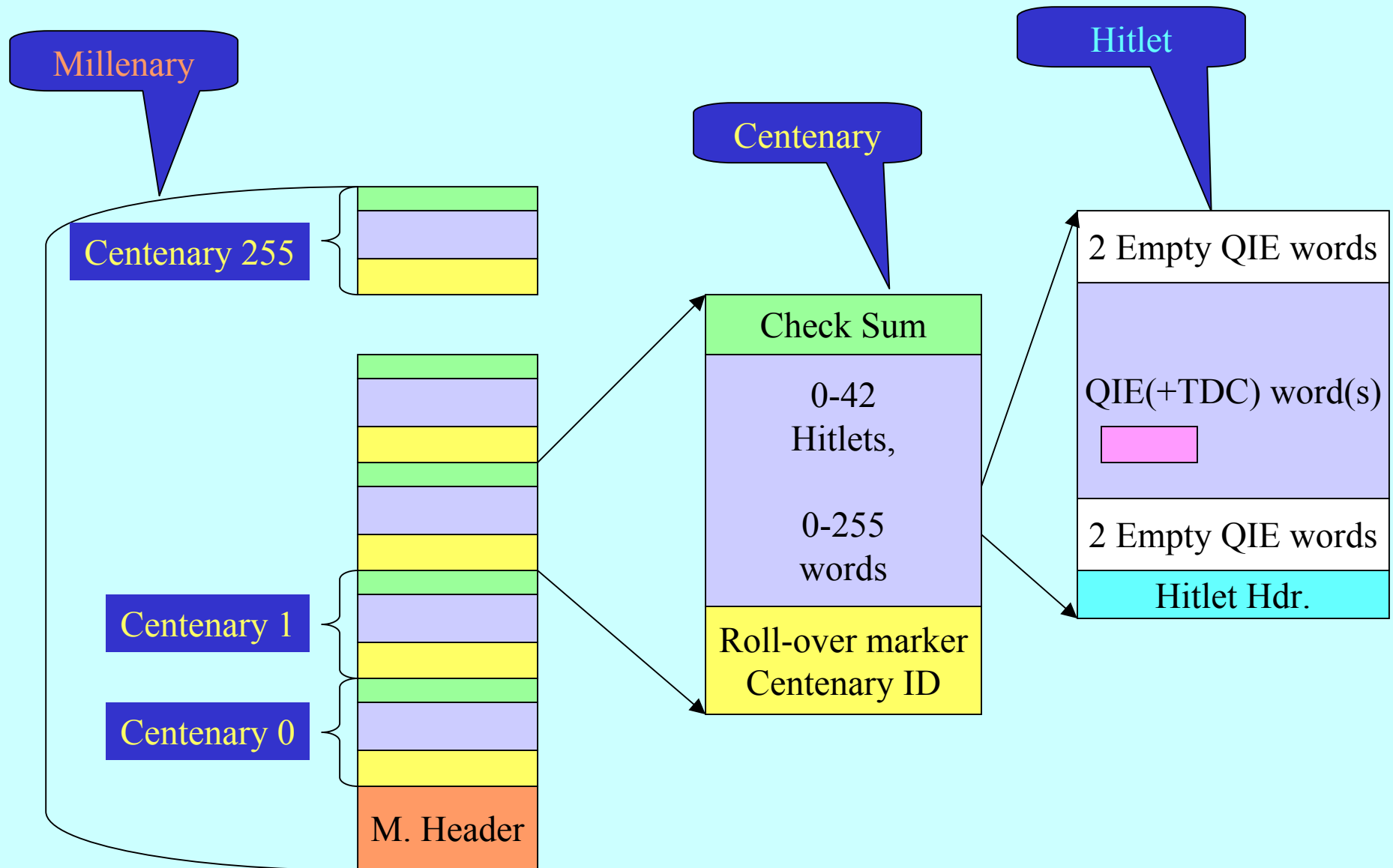
Optional  
Redundant check  
information.  
Inserted after  
collecting the  
whole Millenary

rd d		1	1	1	1	Millenary Check Sum [11:0]			
		1	1	1	1	Millenary Word Count [23:12]			
		1	1	1	1	Millenary Word Count [11:0]			
		1	1	1	1	Unified Channel Number [23:12]			
		1	1	1	1	Unified Channel Number [11:0]			
		1	1	1	1	Reset ID [3:0]	Millenary ID [31:24]		
		1	1	1	1	Millenary ID [23:12]			
		1	1	1	0	Millenary ID [11:0]			

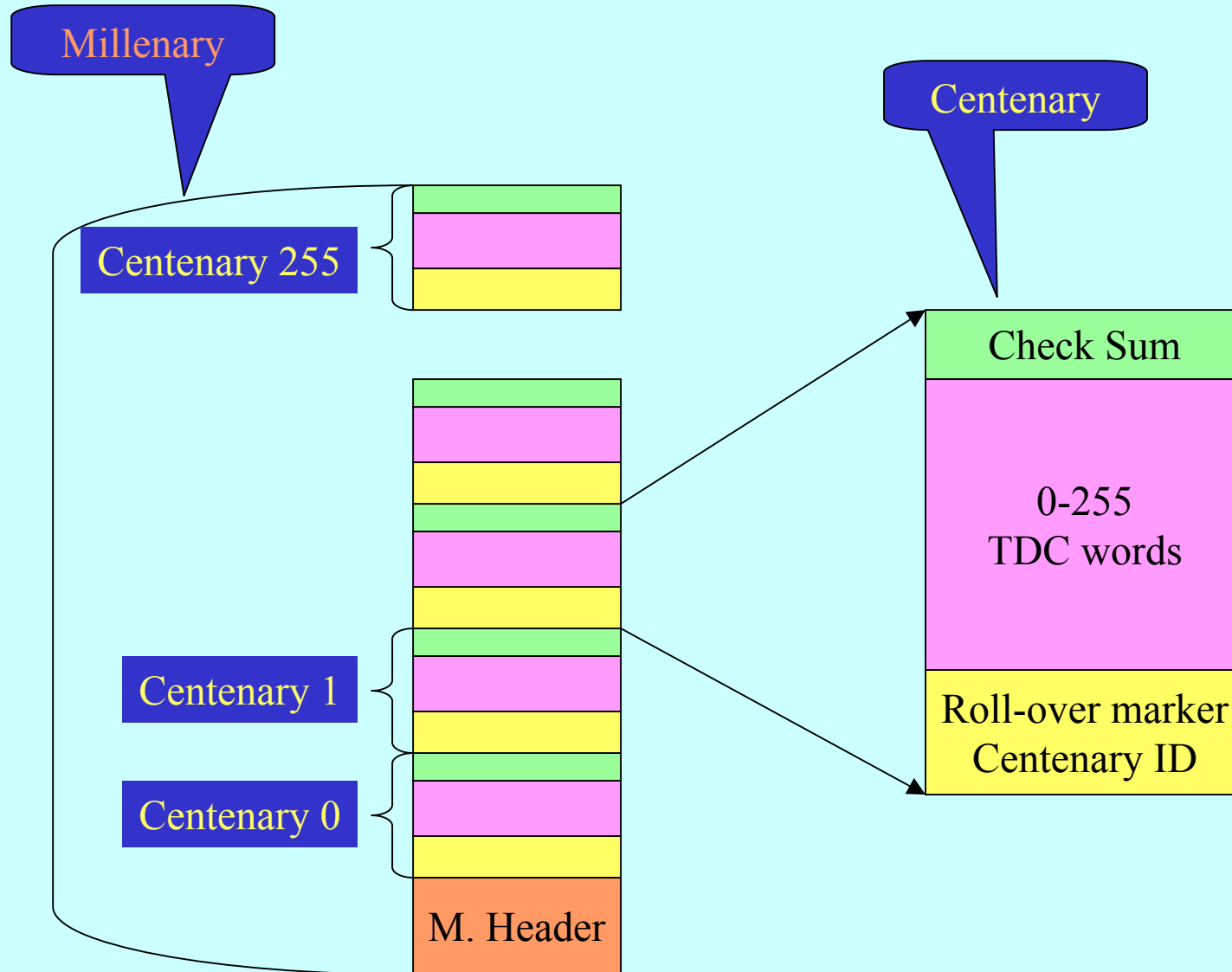
The 2<sup>nd</sup> header word

The 1<sup>st</sup> header word

# (QIE+TDC) Data



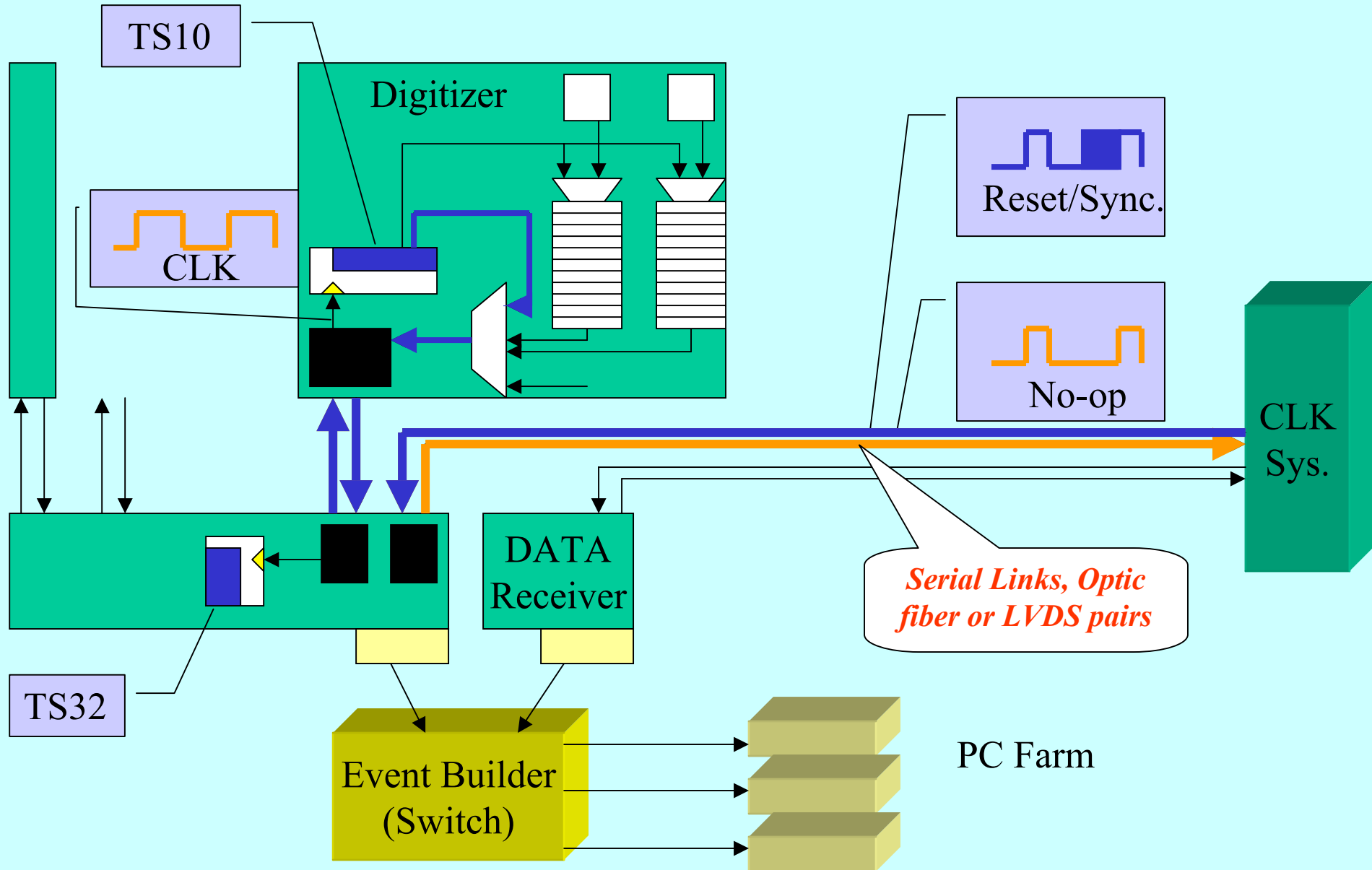
# TDC Data



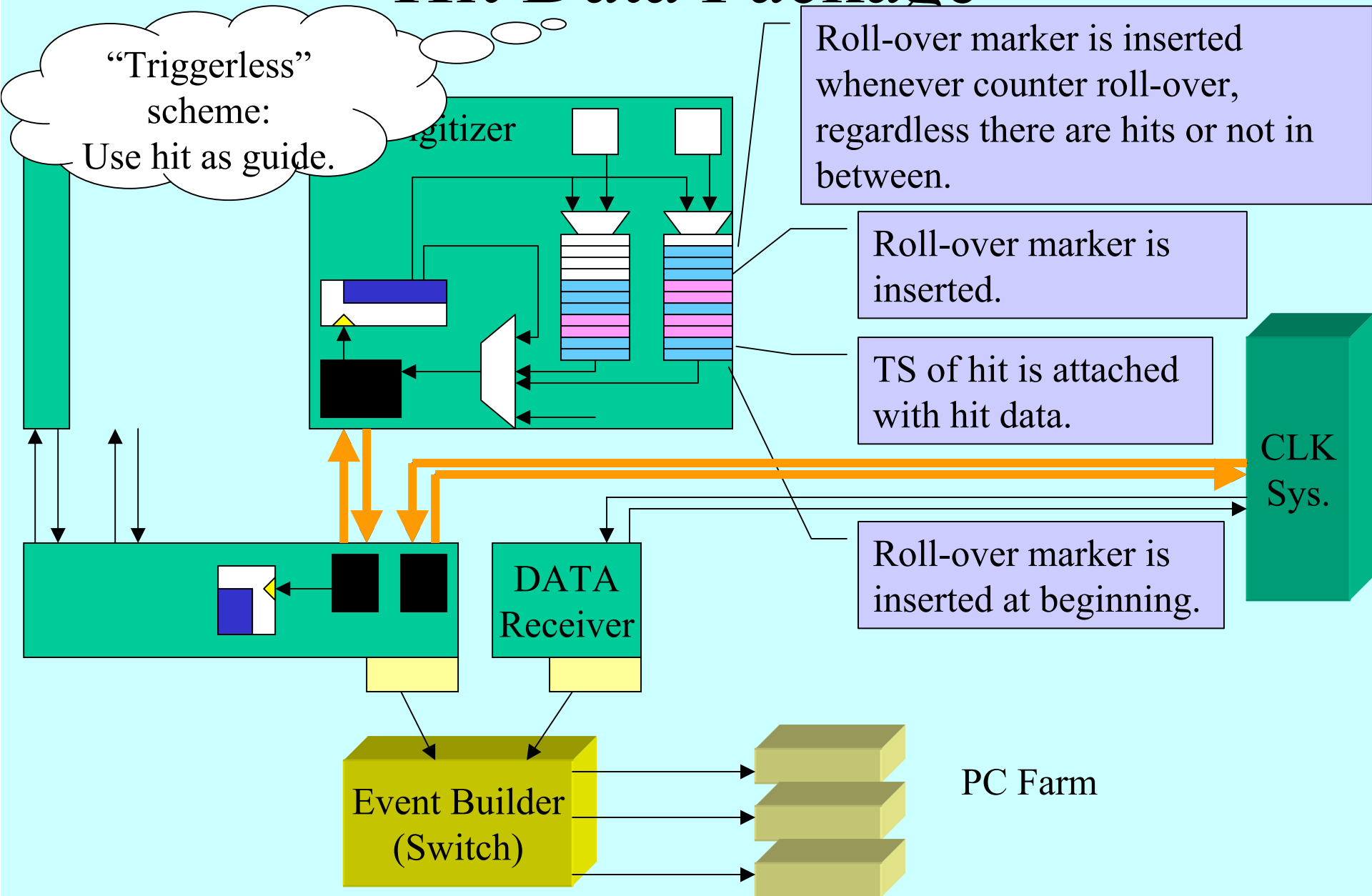
# DAQ System Model



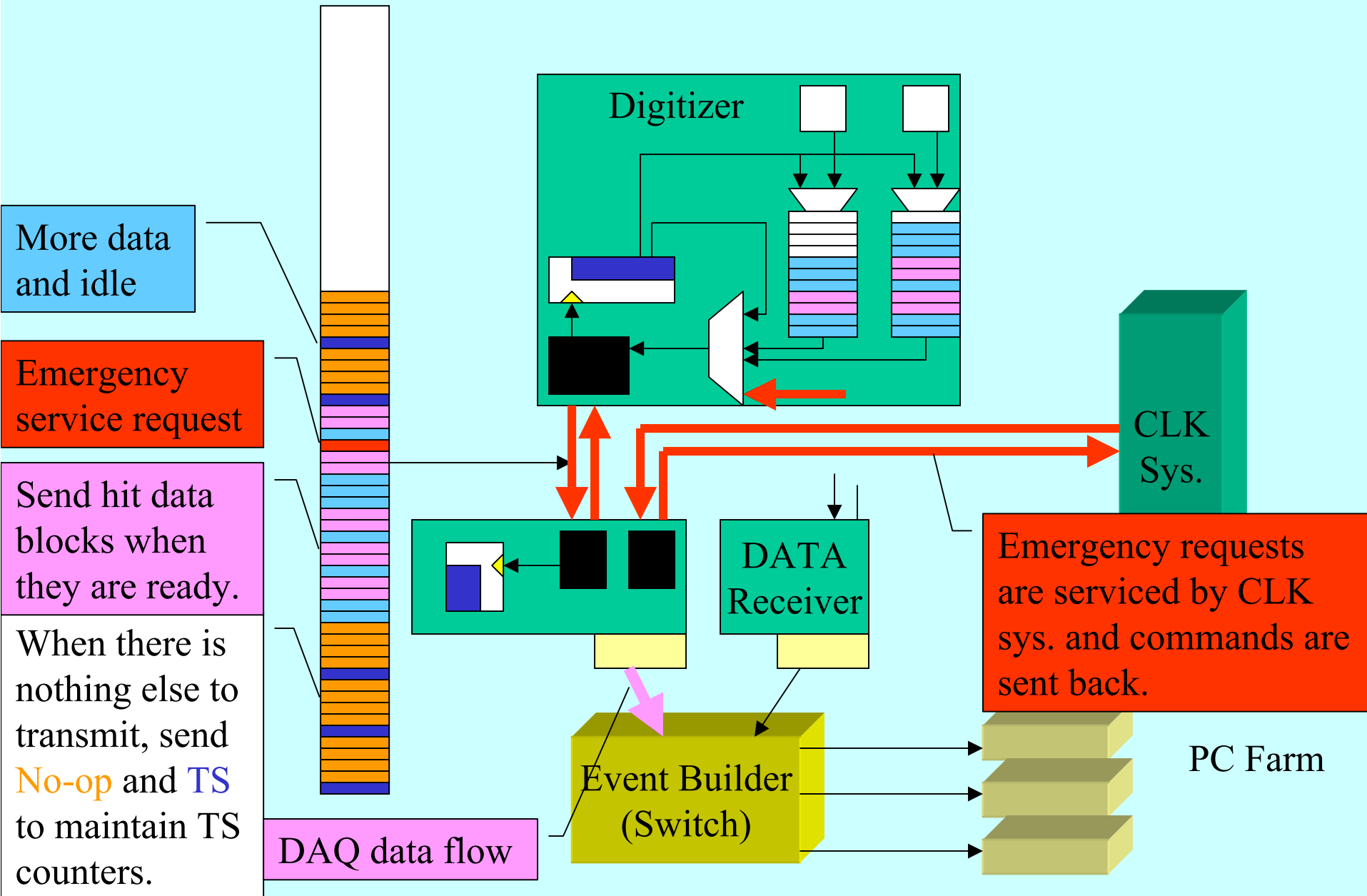
# TS Establishment



# Hit Data Package



# Data Transmit format



The End

Thanks